NASA SBIR/STTR Technologies

E1.03-8501 - Zero G Mass Measurement Device (ZGMMD)

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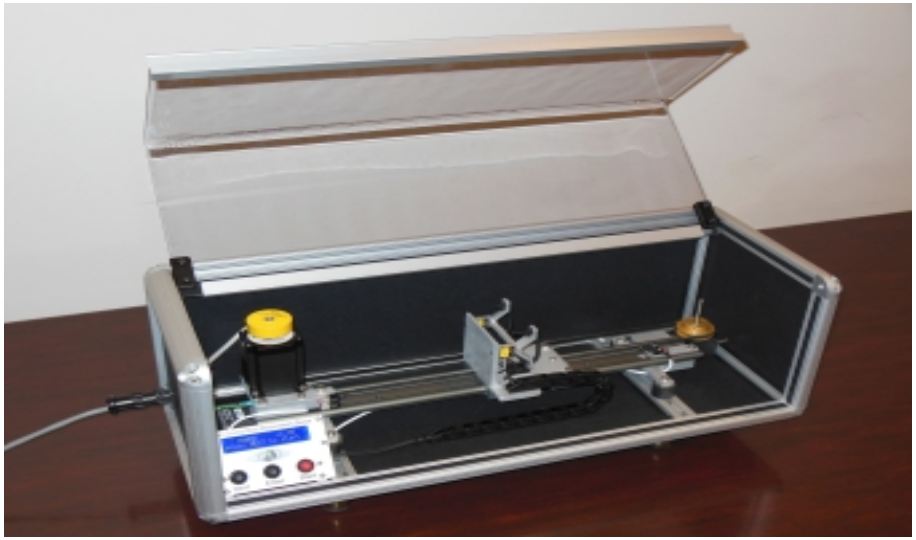
Identification and Significance of Innovation

The Zero Gravity Mass Measurement Device (ZGMMD) provides the ability to measure the mass of samples in a microgravity environment, like that found on the International Space Station (ISS). One of the primary measurements often taken during science experiments is mass. This is even more relevant in biology, where mass is often one of the key measurements taken for analysis. During the Phase I effort, a ZGMMD prototype was developed, tested, and demonstrated the feasibility of a means to determine the mass of samples less than 1kg, without the use of earth's gravity. The ZGMMD's innovative way of determining the mass, of low mass objects, in microgravity environments has been shown to be feasible, and effective. The Phase I prototype has shown to be able to provide great mass measurement capabilities, exceeding the Phase I requirements, specifically in accuracy and precision.



Estimated TRL at beginning and end of contract: (Begin: 4 End: 7)

Technical Objectives and Work Plan

The technical objective is to develop a microgravity mass measurement device that meets the mass measuring needs for most fundamental space biology experiments on ISS. To accomplish this technical objective a detailed flight system specification will be developed, followed by updating the current design to have a preliminary design for a ZGMMD flight system. The PDR will be followed by a Phase 0/1 safety review preparation, and detailed design of the flight system. During the detailed design phase, development of the ZGMMD will focus on improving performance, and meeting the flight system specification. Following the detailed development, a critical design review will be conducted, and a Phase II safety data package will be developed. The final task in the work plan is the fabrication of a ZGMMD flight unit.

NASA Applications

The ZGMMD has an immediate application for NASA aboard the ISS. It could be utilized right away with a number of fundamental space biology experiments that are either in progress, or will be starting soon.

Non-NASA Applications

ZGMMD also has the potential for uses in commercial companies involved with providing space research platforms, like Bigelow Aerospace, Virgin Galactic, Sierra Nevada, Blue Origins, Boeing, SpaceX, and Orbital Sciences. ZGMMD may prove valuable in not only orbital situations, but perhaps even in sub-orbital flights in which mass may be valuable to collect under those conditions.

Firm Contacts

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